

Task Machine Competition Mechanism Workshop

Brought to you by the SILab Advisors!





The 2021 Fall Competition Is... A Task Machine!

- Whaaa? What exactly is a Task Machine?
 - Machine that undoes whatever action it performs.
- Goal:
 - Creativity and Entertainment
 - Simple or complex as you want!
 - Fun challenge
- Example:
 - We made a box with Rhett popping out of it!
- Really cool example





Mechanism Requirements and Goals

• 5 categories the mechanism will be scored on:

- Build Quality (10%)
 - Mechanism has no problems or need for adjustments between runs
- Design (20%)
 - Innovative mechanism for undoing an action
- Creativity (20%)
 - Strive for a wholly unique idea that entertains
 - Takes an existing idea and furthers it
- Functionality (20%)
 - Machine always completes its complex action
- Personality (30%)
 - Machine has lots of actions, (aka has a 'Personality' to it!



CHALLENGE SUBMISSION SCORE

	# Points	0-3	4-7	8-10	Score
e	Build Quality (10%)	Box is Jerry rigged together, held together by tape, etc	Box holds together fine, but the mechanism has problems, needs help or adjustment	Box and mechanism both work well and have been made well. Obviously a quality piece of work	
	Design (20%)	Machine is a basic or rudimentary take on a task machine	The machine's design incorporates either an elegant box/shell or a innovative mechanism for undoing an action	The machine's design incorporates either an elegant box/shell and a innovative mechanism for undoing an action	
	Creativity (20%)	Copies an existing design	Takes an existing design or idea one step further with some improvement (mechanical, quality, or personality)	Wholly unique idea that demonstrates the whole spirit of a task machine (the machine is something that entertains and creates a bit of a sense of wonder)	
	Functionality (20%)	Machine usually completes its action, but sometimes faults	Machine always completes its action but it is very basic	Machine always completes its complex action	
	Personality (30%)	Machine simply does the same thing each time	Machine has a few (2-3) types of action	Machine has a lot of types of action, and seems to have a personality to it	





Basic Arduino Refresher - Hardware Digital Input/Output Pins. Connect signal pins of sensors, lights, etc here. Breadboard (photo) Breadboard (schematic) 5V GND Plug in the USB cde cable here to connect to your DI NOT DIUTING computer. (m) (m)(m) (m) TH TTALY Connect to a 9V battery here if you have an adapter Either of Analog pins, for Provides 5V these will sensors that measure power to a ground a continuum. circuit the circuit BOSTON

UNIVERSITY

5V GND

fgh

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Basic Servo + Switch Example



Basic Arduino Refresher - Software Example



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Arduino board.

SOURCE CODE

* Example Servo + Switch code for mechanism before



Basic Servo + Switch Example

Servoswitchsimple				
<pre>#include <servo.h></servo.h></pre>				
Servo myservo;	// create servo object			
<pre>int pos = 0; int switchPin = 5;</pre>	// variable to store the baseline servo position			
<pre>void setup() { myservo.attach(7); pinMode(switchPin, INPUT); myservo.write(0); }</pre>	// attaches the servo on pin 7 to the servo object // sets servo to Pin 5 I/O // set servo arm to baseline position 0			
}				
<pre>void loop() { if(digitalRead(switchPin) == HIGH) // **circuit is closed w/in switch system (signal in pin 5 is read!)</pre>				
for (pos = 0; pos <= 180; pos	s += 1) // goes from 0 -> 180 deg in steps of 1 deg			
myservo.write(pos); delay(15); 3	<pre>// tell servo to go to position in variable 'pos' // waits 15ms for the servo to reach the position</pre>			
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Online Resources

- How do I Know What I Need to Know?
 - O Spec Sheets (microcontroller, LCD, LEDs, servos, capacitors, etc.)
 - Arduino Uno R3
 - HS-311 Servo
 - o Arduino Project Hub
 - https://wwwinstructables.com/Arduino-Useless-Box/
 - o Arduino Forum
 - o Github, Stackoverflow
 - Multimeters are your friends!
 - Finally... V = IR





Basic Electronic Skills: Soldering





Mechanism Thought Process -





Competition Reminders

- Reminder that competition comes with Prize Money!
- 1st \$300
- 2nd \$200
- 3rd \$100
- Each team will be reimbursed up to \$50 for outside competition supplies!
 - Includes items that can be returned to the lab for future use, such as:
 - Arduino Nano ~ \$10
 - Servo Motors ~ \$12 each/\$24 total
 - Wires ~ \$7
- Work in Teams!
 - If you don't have one and want one we can find a team for you!





QUESTIONS/COMMENTS?

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